

NOTES FOR STUDENTS.

[At the request of the editors Dr. Otto Kuntze has kindly prepared the following brief synopsis of his most recent volume.⁹—EDITORS.]

THE FIRST PAGES (1-384) in the body of the work contain the list of plants collected in Patagonia, Argentine, Chili, Bolivia, Paraguay, Brazil, and also during the author's travels in South Africa. There are described 11 new genera, 18 new subgenera, 566 new species, and more than 600 new varieties. The minor part of the collections was studied by thirty-two collaborators, and 6 new genera and 179 new species have been previously published.

The change in the generic names of phanerogams, according to the Paris Code, are very few, as they were revised in 1891 in volumes I and II.

For the algæ, however, a change of 36 generic names is proposed, and those made in 1891 are mostly defended against the criticisms of M. Le Jolis, who has opposed with the following ideas: (1) that priority be not retroactive; but the Paris Code excludes only names before Linnaeus; (2) that adjectives cannot be used for generic names; but hundreds of such names already exist; (3) that unfit names be rejected; but A. de Candolle has already written "un nom est un nom," and a name needs no meaning at all; (4) that an author be allowed to change his first definition of a genus and its name; but according to § 59 and its official commentary the first definition cannot be annulled; (5) he confounds obligatory and optional articles of the Code; (6) he rejects orthographical license and corrections, although allowed by the Code; (7) he allows only diagnoses for genera to be valid, against § 42 of the Code. His follower, M. Malinvaud, secretary of the Société botanique de France, has failed to make the necessary preparation for a Paris Congress in 1900 to amend the Paris Code of 1867.

As to fungi, I had shown formerly that in Saccardo's *Sylloge* 570 names of genera are entirely omitted. In proving them I have been compelled to renew 111 more generic names in *Revisio III*ⁱⁱ than in *Revisio I* and *II*. I also show that it is impossible to begin the nomenclature of fungi with a later starting point.

In pp. 1-202 of the Introduction I trace the movement in nomenclature from 1893 to 1898, but can report little of it here. However, some American positions may be mentioned. There are now two extreme parties of botanical systematists in the United States.

1. *The old party*, represented by Dr. Robinson, etc., follows no real principle at all, and has only one rule for genera.

"Long established and generally known generic names, such as *Liatris*, *Desmodium*, *Dalea*, *Calycanthus*, *Carya*, *Aspidium*, and others should be

⁹KUNTZE, OTTO: *Revisio generum, etc., III*ⁱⁱ. 8vo. pp. 784. New York: G. E. Stechert. September 1898. \$7.

retained. While the scope of this rule is left to the discretion of writers, it is urged that generic nomenclature should not at present depart far from that of the three important works, Bentham and Hooker's *Genera Plantarum*; Baillon's *Histoire des Plantes*, and Engler and Prantl's *Natürliche Pflanzenfamilien*, from which for some time to come our most complete and accurate information as to generic limits and affinities is to be derived."

I have answered this in *Revisio III*ⁱⁱ as follows: A rule which is left to the discretion of any botanist is no rule at all. The differences between (1) Baillon's *Histoire des Plantes*, who after 1891 accepted 70 per cent. of my nomenclature, reformed according to the Paris Code; (2) Bentham and Hooker's *Genera Plantarum*; (3) the disorderly nomenclature in 10 volumes of Engler and Prantl's *Pflanzenfamilien* by 62 collaborators; and (4) Engler's Supplementary nomenclature, corrected according to his rules, illustrate without further discussion the results of the method suggested. The numerous differences in nomenclature can only be removed by fixed rules, which are also necessary in consequence of the complications arising from competing generic homonyms. Order in nomenclature can only be restored by a consistent application of the rules of the Paris Code, which were adopted by the only international convention that has been held.

2. *The Check List party*, led by Professor Britton and others, with three very wrong principles: (1) 1753 as a starting point, (2) priority of place, (3) once a synonym, etc., applied retroactively.

The initial date, 1753, was originally a Kew proposition, and became fixed like the other "Kew rule," which allows the arbitrary rejection of the oldest specific name. This starting point was hastily adopted by the incompetent Genoa Congress which was "mal informe" as Professor Briquet wrote, who preferred the De Candollian starting point of 1737. It was only supposed, not proved, that 1753 is a rational starting point. But this date for genera is neither scientific, because 1753 is without genera diagnoses, nor is it economical. I have proved in *Revisio III*ⁱⁱ, by a list of examples, that 129 more genera and 7100 more species are to be named with 1753 as a starting point than with 1737. Only 29 of these genera and 152 of these species have been named until now, although I had given in 1893 (*Revisio III*ⁱ) a similar list. That the 1753 rule should be abandoned is effectively shown by the fact that according to it about 100 genera and 6000 species still await renaming. I have also given a list of 64 genera which must be renamed according to either starting point, and another list of 46 other generic names which would be substituted for without profit. Formerly, I called 1753 for genera "initium ignorantium," but now, since its eminent harmfulness has been demonstrated, it becomes the "initium stupidorum" for those who maintain it and are not able to prove the contrary.

The priority of place principle has been applied until now to only 7

genera containing 74 named species, as against its abandonment for 23 genera containing 7310 species. This principle was applied in the manuscript of the *Torrey Check List* and sanctioned at the Madison meeting of 1893, five days before the Madison Botanical Congress. But in the *Check List*, as afterwards printed, this wrong principle was mostly eluded by separating in the Appendix, *Blitum* from *Chenopodium*, *Sarothra* from *Hypericum*, as also formerly *Dalibarda* from *Rubus*, *Phaca* from *Astragalus*, etc., to avoid the change of the thousands of specific names belonging to these genera. Thus the wrong principle was not applied, but resulted in bad taxonomy.

The principle "once a synonym always a synonym" was recommended by me only for future cases in which new names were necessary. If it is applied retroactively, however, it is very harmful, as I showed in 1894 in "nomenclatur Studien" (*Bull. Boiss.* 477-481), and now in *Revisio* IIIⁱⁱ. I show that with the retroactive use of this principle 447 generic names and 16,000 specific names of phanerogams are still to be changed; while only 34 generic and 134 specific names were changed until now by this principle. Since the harmfulness of the retroactive application is so evident, why not frankly abandon it?

Chapter 26 begins with the title "Engler's international breach of faith." He was the enterprising director of the deceased international commission of botanic nomenclature. He put aside the chairman of the commission, Professor P. Ascherson, in 1897, and with the aid of Professor K. Schumann produced fourteen new rules of nomenclature for his *Pflanzenfamilien*, baffling thereby any international congress, although under international obligation. Of these fourteen rules, thirteen were scarcely applicable and merely garniture to the second rule, which proposes to bar generic names that have not come into general use during fifty years, counting from their publication, unless they were taken up in a monograph or large flora, according to the laws of nomenclature of 1867. This ambiguous rule, of little profit, had already been declined in 1894 in Vienna by the Naturforscherversammlung, with the suggestion that it be approved by a competent congress. This rule was unfairly applied only in the supplement to Engler's *Pflanzenfamilien*, otherwise the editor would have been compelled to accept most of the reformed nomenclature of *Revisio* I and II. These fourteen rules were subscribed to by the officers of the Berlin Botanic Museum in a very careless manner, as is also shown by the "ich" of the editor, which "ich" remained uncorrected in these rules, although subscribed to by fourteen persons. They had never considered beforehand and together these rules, which have been also more or less declined by Professor Wettstein (Prag), Professor N. L. Britton (New York), Le Jolis (Cherbourg), Briquet (Geneva), James Britten (London), and E. Heirn, who has written in *Journal of Botany* (27:494. 1898) that I criticised these rules in *Revisio* IIIⁱⁱ in a masterly way, and rejected the

second rule with powerful arguments. In a list (pp. 100-125) I show that 618 of my reformed generic names among the phanerogams, out of 740 in *Revisio* I and II, have been already accepted since 1891 by botanists all over the world, or that some of the names not yet accepted could not be rejected by the Berlin rules.

In pp. 40-42 I sum up the obscurities of the Kew Index. In chapter 31 I add further notes to Pritzel's *Thesaurus*, with exact dates for wrong or unknown dates of publication.

Since a competent international congress at Paris in 1900 is not possible, and the amendment of the Paris Code will scarcely be obtained for a long time, the only way to obtain international order in botanical nomenclature is by strictly following the Paris Code with my amendments, which are not at all revolutionary. But since the starting point 1735 has found everywhere least acceptance, it will be best to take the only really scientific and the most economical starting point of 1737. — DR. OTTO KUNTZE, *Villa Girola, San Remo, Italy.*

ITEMS OF TAXONOMIC INTEREST are as follows: A fascicle of eighteen new species of Lower Californian plants is published by T. S. BRANDEGEE in *Erythea* (7: 1-9. 1899). — A new Botrychium from New England (*B. tenebrosum*) is published by A. A. EATON in *The Fern Bulletin* (7: 7. 1899). — In the *Bull. Torr. Bot. Club* (25: 605-621. 1898) JOHN K. SMALL continues his "Studies in the botany of the southeastern United States." Twenty-four new species are described as follows: *Melanthium* (1), *Smilax* (4), *Gyrostachys* (3), *Oxalis* (2), *Physostegia* (1), *Euphorbia* (4), *Hypericum* (1), *Gaura* (1), *Verbena* (1), *Gerardia* (2), *Solidago* (1), *Doellingeria* (1), *Aster* (1). The author's name *Forcipella* for a genus of the Paronychiaceæ having been preempted, he has replaced it by *Gibbesia*, in honor of Professor L. R. Gibbes, of Charleston, S. C. — In the same journal (626-629) A. A. HELLER publishes further notes concerning the plants of western North America. A new genus, *Fendlerella*, is proposed, established on *Fendlera* (§ FENDLERELLA) *Utahensis* Greene (*Whipplea Utahensis* Watson); and another new genus, *Macdougalia*, is established on *Actinella Bigelovii* Gray. — In the same journal (26: 5-11. 1899) AVEN NELSON publishes ten new species of Wyoming plants in the following genera: *Scirpus*, *Sagittaria*, *Lilium*, *Abronia*, *Arenaria*, *Aconitum*, *Astragalus* (4 spp.). — H. NESS, in the same journal (26: 21-22. *pl.* 351. 1899), describes a new *Lacinaria* (*Liatris*) from Texas. — E. L. GREENE has just published (*Pittonia* 4: 1-24. 1899) four new species of *Castilleia* from the west, and a fascicle of seven new violets; has renamed *Viola bicolor* Pursh, calling it *V. Rafinesquii*; has described five new western roses, one of which (*R. pratinicola*) is the very common prairie form commonly referred to *R. Arkansana* or *R. blanda*; has established fourteen new species of western "choripetalous exogens" in the

following genera: *Aquilegia*, *Ranunculus* (2 spp.), *Cleome*, *Draba* (7 spp.) *Thelypodium*, *Amelanchier* (2 spp.); and has published notes on seven species of *Machæranthera*, two of which are new. — B. L. ROBINSON has described and figured (*Rhodora* 1:12. 1899) a new *Lactuca* (*L. Morssii*) from Massachusetts. — In Engler's *Bot. Jahrb.* (25:578-708. 1898) F. REINECKE completes his account of the flora of the Samoan islands. In a previous paper (23:237-368. 1896) the cryptogams were given; in this paper the "siphonogams" are presented, and also a complete species index to both papers. The total enumeration contains something over 1200 species, 141 of which are new. — In the same serial (709-721) R. PILGER describes thirty-one new species of South American (Columbia, Ecuador, Peru, and Bolivia) grasses, one of them representing a new genus, *Dasyphoa*. — In the same serial (722-733) a series of papers upon the plants of Ecuador is begun, the families being assigned to different authors. Numerous new species are described, especially by K. Schumann, among the *Asclepiadaceæ*, six species being added to *Cynanchum*, and a new genus, *Anomotassa*, described. — In the same serial (26:235-424. 1899) A. ENGLER continues the publication of the African flora. The *Passifloraceæ*, *Araliaceæ*, and *Leguminosæ* II (new genus *Fillæopsis*) are by H. Harms; *Euphorbiaceæ* IV (new genera *Crotonogynopsis* and *Tetracarpidium*) by F. Pax; *Orchidaceæ* by R. Schlechter; a new genus (*Megalochlamys*) of *Acanthaceæ* by G. Lindau; the African species of *Brunnichia* by U. Dammer; a new genus (*Charadrophila*) by R. Marloth, which possibly belongs to the *Gesneriaceæ*; *Piperaceæ* II by C. De Candolle; *Piperaceæ* III, *Gesneriaceæ* III (new genus *Carolofritschia*), *Burseraceæ* II (new genera *Canariastrum* and *Porphyranthus*), *Rosaceæ* II, *Monimiaceæ* (new genus *Chloropatane*), *Lauraceæ* (new genus *Tylostemon*), *Menispermaceæ* (new genera *Miersiophyton*, *Kolobopetalum*, *Syntriandrium*, *Limaciopsis*, and *Heptacyclum*), *Araceæ* II, all by A. ENGLER. — In the same serial P. GRAEBNER (425-436) discusses the South and Central American species of *Valeriana*, suggesting *Phaodendron* as a new section or possibly a new genus; and F. KRÄNZLIN (437-448) begins an account of the *Orchidaceæ* collected by Lehmann in Guatemala, Costa Rica, Columbia, and Ecuador. — MAXWELL T. MASTERS has determined (*Jour. Bot.* 37:1-11. 1899) that the juniper of Bermuda and that of Jamaica are specifically distinct, and that the latter is *J. Virginiana* L. (*J. Barbadosensis* L. ex Griseb.), so extensively distributed throughout North America. The Bermudan plant (*J. Bermudiana*) is only known outside of Bermuda in cultivation, and seems to have been derived from the continental *J. Virginiana*. Why a form in Bermuda should have become specifically distinct, and one in Jamaica should have retained its specific characters, is an interesting question. — Another contribution to the African flora is a study of the genus *Boscia* by ANTON PESTALOZZI, being one of a series of papers published from the Botanical Museum of the Uni-

versity of Zürich. The taxonomic presentation is preceded by an excellent account of the morphology and anatomy of the genus. The twenty-nine species, five of which are new, are treated with remarkable fullness, an average of four pages being given to each one. Fourteen excellent lithographic plates, some of them colored, accompany the paper.—R. I. CRATTY in *Bull. Lab. Nat. Hist. Iowa* (4: 313-375. pls. 10. 1898) has published a list of Iowa sedges, with synonymy and distribution. It contains 114 species and varieties, representing ten genera, *Carex* containing 78. Following the list are some interesting tables comparing the Iowa sedge flora with that of neighboring states.—W. N. SUKSDORF has published in *Deutsche bot. Monatschrift* (16: 220-222. 1898) an account of certain Washington species of *Claytonia*, which he refers to *Montia* and renames.—An enumeration of the species of plants collected by Dr. W. C. Shannon in Central America in connection with the survey of the Intercontinental Railway Commission has been published by JOHN DONNELL SMITH (*Intercont. Railway Com.* 1: part 2. appendix 3. pp. 1-24. 1898. Washington.)—J. M. C.

MR. V. H. BLACKMAN, in his study of *Pinus sylvestris*¹⁰ has made an important contribution to our knowledge of the subject of fertilization. Beginning with the formation of the ventral canal cell, the processes are traced with considerable detail up to the early stages in the formation of the sporophyte. During the great increase in size which the oosphere nucleus undergoes previous to fertilization, it becomes filled with a metaplasmic substance, at first granular, but in later stages taking the form of an elaborate reticulum, which might easily be mistaken for chromatin. The true chromatin, however, consists of a few small, rod-shaped masses.

The entire contents of the end of the pollen tube pass into the oosphere. The four nuclei are plainly visible as they enter the egg, but it is impossible to distinguish the stalk nucleus from the tube nucleus. As the sex nuclei come into contact, they are seen to contain numerous kinoplasmic threads which the writer regards as the beginning of the first segmentation spindle. The two groups of chromosomes, belonging respectively to the male and female nuclei, can be distinguished after the nuclear fusion is complete, and even after the first segmentation spindle is nearly formed; in fact, the chromosomes were observed to undergo longitudinal splitting while the two groups were still distinct. According to all previous accounts of fertilization, the fusion nucleus enters a resting stage before segmentation begins. Since this paper was written Berlese has given a similar account of *Peronospora*.

The structure of the cytoplasm of the egg and the development and fate of achromatic figure, led to the conclusion that there is no specific kinoplasmic or archoplasmic substance, but that the fibers result from a rearrangement of the ordinary cytoplasmic reticulum.

¹⁰On the cytological features of fertilization and related phenomena in *Pinus sylvestris*. *Phil. Trans. Royal Soc. London* 190: 395-426. 1898.

Blackman was not able to confirm Dixon's observations on the number of chromosomes. Dixon reported eight chromosomes in the nuclei of young embryo-sacs, eight in the nucleus of the oosphere, usually twelve but sometimes eight or twenty-four in the nuclei of the cells sheathing the oosphere. Dixon was not able to make a direct count of the chromosomes in the oosphere nucleus, but inferred the number from counting bodies in the nucleus of the ventral canal cell, which may have been disorganized chromatin and not normal chromosomes. Blackman's work, which was much more extensive, shows the number of chromosomes in the various nuclei to be as follows: In the egg, twelve; in pollen mother cells, twelve; nuclei of the female gametophyte, twelve; first division after fertilization, twenty-four; later divisions, over twenty-one and presumably twenty-four.

On account of recent work on Ginkgo, Cycas, and Zamia, a careful search was made for traces of cilia, blepharoplasts and centrosomes, but no such structures could be found, and the evidence furnished by Pinus was believed to bear out the conclusions of the various writers of the Bonn school against the presence of centrospheres in plants higher than mosses. — CHARLES J. CHAMBERLAIN.

PROFESSOR W. F. GANONG has published in the *Annals of Botany* (12: 423-474. 1898) further results of his investigation of the Cactaceæ, giving an account of the comparative morphology of the embryos and seedlings. The group is so modern and so plastic that the author anticipates that the phylogeny of its genera and species may be discovered with remarkable completeness.

As a result of the numerous germination experiments, some interesting conclusions are reached. Beginning with *Pereskia*, and passing by way of *Cereus* and *Echinocactus* to *Mamillaria*, the author calls attention to a progressive condensation in bulk of the germinated embryos, and consequent diminution of surface brought about by the increasing approach to a spherical form of the hypocotyl and diminution of the cotyledons. This progressive condensation of the embryos runs parallel with the condensation in the adults, but lags behind it, so that adult and embryo do not always correspond. The explanation suggested is that as the adult acquires a certain adaptive character, and it becomes more fixed and intensified, it tends to work back into earlier and earlier stages in the ontogeny of the successive individuals, until it finally reaches the embryo.

A phylogeny of the genera is constructed, based upon these recent observations, together with previously recorded facts. Neglecting the numerous genera which are not represented in our flora, and which for the most part are lines of secondary importance, the main points of the proposed phylogeny are as follows: *Pereskia* is regarded as nearest to the original stem-form of the family, and the earliest derived line was *Opuntia*. From the primitive

Opuntia forms the columnar *Cereus* line was derived, with its numerous generic branches and diverse habits. Low down upon the columnar *Cereus* line the *Echinocactus* line branched out, which gave rise later to *Mamillaria*, and still later to *Anhalonium*. — J. M. C.

A REDUCTION DIVISION of the chromosomes (in Weissmann's sense) is supposed by most botanists not to occur in plants. Guignard, Strasburger,¹¹ Sargent, Mottier, and many others find a longitudinal division of the chromosomes, and, consequently, only a numerical reduction. Schaffner finds a transverse division, and, consequently, a qualitative division (reduction division) in the first division in the embryo-sac of *Lilium*; Belajeff believes that a reduction division takes place in the second division of pollen mother cells; Calkins finds a reduction division in the second division of the spore mother cells of ferns.

A recent paper by W. C. Stevens¹² deals with the chromosome problem in ferns. *Scolopendrium vulgare*, *Cystopteris fragilis*, and *Pteris aquilina* were investigated. The writer's summary is about as follows: In the first division of the spore mother cell the spirem thread splits longitudinally and then segments into one half the usual number of chromosomes. The daughter chromosomes are short and thick, and in their form resemble tetrads, but there is no transverse division. The daughter chromosomes begin to separate sometimes at the ends and sometimes in the middle, thus forming double rods or ring-shaped chromosomes. In the daughter nuclei the chromosomes unite into a single nuclear thread. In the second division this thread splits longitudinally and segments transversely, as in the first division. It follows that there is merely a reduction in the number of chromosomes, and not a reduction division. Calkins's figures lack important stages and do not prove a reduction division. A thorough search failed to reveal centrosomes or multipolar spindles. — CHARLES J. CHAMBERLAIN.

FORESTRY IN MINNESOTA, by Professor Samuel B. Green, published by the Minnesota Forestry Association, has been recently issued. It is neatly bound and well illustrated, and contains a good glossary and index, small details that greatly enhance the value of a most useful book. Professor Green has here brought together his class lectures, and they show him to be a thoroughly practical instructor. The little book contains just what the intending planter and the forest land owner need to know. The theory of tree growth is sketched, but the book is full of good practical suggestions on

¹¹ Strasburger and Mottier reported a transverse division in pollen mother-cells, but almost immediately acknowledged that their conclusion needed revision. *BOT. GAZ.* 26: 220-221. 1898.

¹² Ueber Chromosomentheilung bei der Sporenbildung der Farne. *Ber. d. deutsch. bot. Gesell.* 16: 261-265. 1898.

such useful and unfamiliar facts as the time of seeding, the treatment of forest tree seeds, the management of the forest nursery, planting, pruning, forest management, etc. With these, which are evidently based on experience, are full descriptions of the trees of Minnesota. It will prove valuable far beyond the limits of Minnesota. — CHARLES A. KEFFER.

THE WORK of Rimbach on geophilous plants has been previously alluded to.¹³ He has recently published a contribution on the growth of rhizomes in depth.¹⁴ Rhizomes have a so-called normal depth, varying with the species. Rimbach's experiments show that a removal of the soil from over a rhizome causes a downward growth, while a deep burial causes upward growth. These results are commonly brought about by a change in the direction of the rhizome axis, though sometimes by root contraction. Since these changes do not take place until some organ of the plant reaches the surface, the author thinks that they are caused by a greater or less need for structural materials on the part of the plant. — H. C. COWLES.

E. OVERTON makes a preliminary announcement¹⁵ of a forthcoming paper on some experimental work on autumnal coloration. This much-vexed subject has long needed careful physiological investigation. He thinks that the red coloring matters of plants are probably glucosides, and in most cases unions of tannin compounds with sugar. The chief physical factors involved are sunshine, which augments sugar production, and low temperature, which prevents the conversion of sugar into starch. The replacement of starch by sugar in autumn and winter leaves had previously been shown by Lidfors.¹⁶ Overton found that red tints could be produced in many leaves at any season by feeding them with glucose. — H. C. COWLES.

DR. GEORGE BITTER¹⁷ has made some extended observations on the contact relationship of growing crustose and foliose lichens. The relationship is said to be mostly of a saprophytic nature. In some instances contact lines vanish entirely, as when different individuals of *Variolaria globulifera* meet. Growth contact of different species may result in a complete or partial destruction of the less resisting species. In some instances the contact phenomena partake of the nature of parasitism (antagonistic symbiosis). The view is expressed that lichens take but comparatively little nourishment from the substratum. The principal function of the substratum seems to be that

¹³ Bot. Gaz. 23: 478. 1897.

¹⁴ Beiträge zur wiss. Bot. 3: 177-204. 1898.

¹⁵ Nature 59: 296. Jan. 1899.

¹⁶ Bot. Cent. 68: 33-44. 1896.

¹⁷ Ueber das Verhalten der Krustenflechten beim Zusammentreffen ihrer Ränder. Jahrb. f. wiss. Bot. 33: 47-127. figs. 1-14. 1898.

of a support. The author also refers to several fungi which are not generally recognized as lichens, namely, *Karschia (Buellia) scabrosa* and *Lecidea intumescens*. — A. SCHNEIDER.

IN A review of recent researches on the spermatozoids, Zacharias expresses himself thus on the centrosome question: ¹⁸

“ However, on an unprejudiced consideration of the literature involved, one may consider it not impossible that, on renewed search, the centrosomes will finally be again discovered where, for the present, they have been missed.” — C. R. B.

DR. H. VON SCHRENK has been studying the mode of dissemination of *Usnea barbata*,¹⁹ and finds that the wind is the chief agent of transfer. The long strands are broken and carried from tree to tree, and owing to hydroscopic movements the transported strands may soon become entangled with the new host. A similar study of *Ramalina reticulata*, by Peirce, was published in the BOTANICAL GAZETTE (25 : 404. 1898). — J. M. C.

¹⁸ Bot. Zeit. 57² : 6. 1899.

¹⁹ Trans. Acad. Sci. St. Louis 8 : 189-198. 1898.